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ABSTRACT

The Study identified the critical educational needs of each geographical area in the State and indicated that measurement should be in terms of the cognitive and affective behavior of students. Phase one of the Study was conducted on the concept that the school and classroom, as a social system, provides the setting within which the self-system of the learner is expressed in three output areas: learner-oriented behavior in the cognitive domain, learner-oriented behavior in the affective domain, and the interrelationships of these cognitive and affective behaviors. These behavioral outputs were considered as indicators of self-perceptions, verbally expressed behaviors, and manifest behaviors which the learner originally possessed on entry to the school and classroom. Phase two, concerned with the psycho-motor (P-M) domain, yielded information about the nature of the P-M domain, data regarding instruments of measurement, and incidence figures for the school population. Eight separate areas of P-M functioning were assessed. Through Phase two of the needs assessment study in all three domains, Virginia hopes to become fully accountable for providing quality education for every child in the public schools of the commonwealth. (Author/RC)

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VIRGINIA EDUCATIONAL NEEDS ASSESSMENT

OF PUBLIC SCHOOL CHILDREN

IN THE COGNITIVE, AFFECTIVE AND PSYCHO-MOTOR

DOMAINS

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PART I

COGNITIVE AND AFFECTIVE DOMAINS

INTRODUCTION:

In 1969 Virginia assumed full responsibility for the administration of Title III ESEA. At that time, the Virginia State Department of Education, as part of the Title III ESEA State Plan, initiated a program to assess the educational needs of public school children. On June 30, 1969, the Department, utilizing Title III ESEA administrative monies contracted with the Bureau of Educational Research at the University of Virginia to collaborate in an assessment study.

The mandate was established to concentrate on the assessment of learner-oriented needs including the cognitive and affective domains. With this in mind, the Bureau staff and State directors agreed on the following objectives:

1. To examine the aspirations of and for elementary and secondary school children in Virginia;
2. To examine achievements related to these goals;
3. To determine the relative severity of educational needs;
4. To provide a basis for periodic review of future educational needs;
5. To convey to lay and professional communities an awareness of the values of, and procedures for, effective assessment of educational needs.

The Virginia Educational Needs Assessment Study provides the historical background and procedures, used in determining the affective and cognitive needs of Virginia school children.

The Needs Assessment Study identified the critical educational needs of each geographical area in the State Corrective action begins with an attempt to decrease or to eliminate identified needs. The following statement from the study is important in determining points of departure to overcome identified needs:

> No need reported here or elsewhere in the cognitive findings of the study does not mean that pupils in these regions do not have needs in terms of other standards imposed by the local school divisions,

such as performance on reading objectives. No need does mean that pupils in certain regions on the average did not vary significantly below State average performance on the standardized test used.

It should also be noted that this study is restrictive in the identification of needs in that only 57 of the 131 school divisions in the State in 1969 were involved; moreover, one school within the division may have been high or low in certain areas of achievement, but the compilation of findings increased or decreased the level of achievement for the entire division.

A 10% sample was utilized in this Needs Assessment Study in grades four, seven and eleven as well as including data from selected principals, teachers, supervisors and certain other school personnel.

Following is a statistical breakdown of the sample

57 of 131 school divisions
207 schools at grade four
151 schools at grade seven
138 schools at grade eleven

Class Sections utilized

208 class sections at grade 4
283 class sections at grade 7
239 class sections at grade 11
Total Sections 802 (790teachers)

Pupil Sample size

7000 fourth grade students
7075 seventh grade students
5,975 eleventh grade students

IMPLICATIONS OF THE STATE NEEDS ASSESSMENT:

Measurement

The Needs Assessment Study indicated that measurement should be in terms of the cognitive and affective behavior of students .

Implications within the study are:

1. Local school divisions in many instances can better evaluate pupil achievement through locally developed tests than by standardized testing.

2. Individuality of students will be lost and most creativity will remain undiscovered when teaching is directed toward the test.

3. The humanistic element is a significant component in the education experience of pupils.

4. Evaluation is much more complex than the objective approach and can be effectively accomplished through personal discussion and interview, individual inventories, subjective test questions, student reports, and pupil acceptance of responsibility for personal integrity and critical thinking.

Identification of Needs

1. A need is defined as a gap between an educational objective and outcome in terms of performance on cognitive clusters in achievement tests.

2. It is essential that it be first determined that a need exists. Therefore, due to limitations of the study, each school division must recognize that, although a need has not been identified for a particular region, this does not absolutely exempt the region from any need at all.

3. Other needs were identified which were not rated as critical but could be contributing factors to the existance of critical needs. These include:

   A. Programmatic efforts for special children which are insufficient toward covering the needs spectrum.

   B. Insufficient audio-visual materials and curricular services to complement the curriculum meaningfully.

   C. Lack of teacher participation in decision-making.

   D. Weak administrative services in support of curricular and instructive efforts.

   E. Insufficient supervision in physical education, art, music science and speech in elementary schools.

   F. Insufficient supplementary tests and materials including outdated or inadequate laboratory equipment and materials.

   G. Curricular services in remedial reading and research below the minimum.

   H. Inadequate guidance, psychiatric, psychological, medical and health, attendance, homebound teaching, and speech and hearing services.

   I. Insufficient supervisory personnel at all levels to implement an ambitious role of encouraging school self-evaluation, and providing follow-through services

J. A gap existing between programmatic recommendations and equity of State financial support among local school divisions.

Testing

1. A third implication is related to the Statewide Testing Program. Part of the plan of the study staff was to use performance on each test item, in the Statewide testing program, to measure a learner-oriented objective in the cognitive domain as evidence of a specific educational outcome in the determination of a need which previously had been defined as a gap between an educational objective and its attainment. The standardized achievement test items were written prior to and independently of the objectives selected, develcped and approved for the study. The study staff, therefore, chose to set 75 percent as the standard test score on item coverage of the total objectives in each subject area: English, reading, social studies, mathematics, Science and work study and library skills. In no subject area did the tests administered to sample grades 4, 7 and 11 meet the 75 percent standard. Ranked order of the general cognitive objectives covered by subject areas follow:

Reading	53.9%
Social Stuides	50.0%
Mathematics	47.8%
Science	37.5%
English	25.5%

2. Reading: Of the nine skill areas measured, inadequate coverage was noted in the measurement of mechanics of reading (20.8%) organizational skills (33.3%), interest in reading (0.0%). Less than 50% of the objectives in interpretative and critical reading were measured.

3. Social Studies: A marked lack of coverage was apparent in history and political science in comparison with the distribution of anthropology-sociology, economics, and geography. Interpretation here should be cautious since 18 objectives and 9 items were involved in the computation of percentage.

4. Mathematics: Seven topical skills were included. Four areas were not sufficiently assessed: sets and number (0.0%), geometric concepts (42.8%), graphs (0.0%) and symbol utilization (33.8%). This relatively low degree of evaluation is possibly the result of matching modern mathematics objectives with traditional mathematics test items.

5. Science: General objectives were arranged in three basic areas of which (a) knowledge of scientific understanding of values in interpreting the environment and (b) ability to apply scientific knowledge were adequately assessed, (55.5%) and (66.7%) respectively. Skills associated with scientific techniques and processes were measured by only 16.7% of the items.

6. English: Of the 18 topical areas of objectives, 10 lacked any coverage. In 5 areas only one or two objectives were tested. In only three areas was measurement adequate: punctuation (75.0%) spelling (69.2%) and grammar (57.1%)

7. Volume I of the study may be examined for specific details and additional information. It seems implicit, however, that although national standardized tests are useful in that they make possible intra-division and inter-division achievement comparisons in the cognitive domain and enable a state to compare pupil performance with normative performance of pupils in the nation, curriculum disparities handicap the success of national standardized tests to measure in a state or district or school specific instructional objectives and outcomes in most, if not all subject areas.

8. With one exception, the alternative procedure to assess performance as evidence of educational outcomes was adopted: measure performance of the sample on the subtests or "cognitive clusters" of the Statewide achievement tests. Thus, cognitive needs were identified by gaps between performance on subject cognitive clusters and their related learner-oriented cognitive objectives.

Affective Domain:

1. It has been suggested that cognitive learning efficiency is related to, or even dependent upon, the learner's efficiency in acquiring the dominant attitudes, values, and belief systems of the learning environment. The greater discrepency between the affective domain of the self-system and the learning environment, the more difficult the task of the learning process. If this concept is accepted, then the implication is clear — the self-concept of all students must be a positive one, and all school personnel are charged with the responsibility of assisting each student in this realization.

2. Classroom teachers are almost universally perceived as the State's most important resources for school reform. Also, among the variables in the school and classroom as they affect pupil outputs and needs, perhaps the teacher in the classroom is the most important, particularly in his/her affective influence. Once again, the implication is clear - special attention must be given to recruitment, the training, and the working conditions of teachers.

3. Few professionals, much less laymen, are able to agree on what constitutes appropriate attitudes, values, and behavior. Three implications are apparent within this statement:

   A. Such basic qualities as individuality, creativity, and moral development can not be ignored.

   B. Each school within a school system must determine desired attitudes , values, and behavior for that particular pupil population.

C. Measurement for the intangibles: attitudes, values and behavior is a difficult one, sometimes impossible. Methods for assessment, as objective in nature as possible, should be developed by individual schools.

4. The crucial age group with regard to self esteem is Grade 7. Concerted efforts must be made in individual schools to assist these students to develop a positive self-concept.

5. All school personnel must be constantly aware of research being done and of the findings. They must, then, transfer to their own situation the findings which are appropriate and useful.

6. Recognizing the limited number of valid instrumentation in the affective domain, the Bureau of Educational Research, University of Virginia, developed for this study and partially validated during the study the Virginia Affective Assessment Questionnaires (VAAQ) for grades four, seven and eleven.

SUMMARY VIRGINIA EDUCATIONAL NEEDS ASSESSMENT STUDY

Cognitive Achievement and Needs: Grade 4

Regional comparisons were made on the basis of the Statewide totals. The Statewide totals were compared with national norms. Regionally, mean levels of verbal I.Q. were highest in Northern Virginia and lowest in Tidewater Virginia and Southside Virginia. The defined low abilities in the Southside and Tidewater regions have added significance in the context of low cognitive means in these two regions, as do the defined high abilities in Northern Virginia in the context of high cognitive means in this region.

The SRA Achievement Series, Blue Level was used to determine cognitive performance. Due to the fact that this battery was administered in March 1970 a time for which there are not set national norms, the staff adjusted the national norms to correspond to a grade equivalency of 4.7.

Regionally, Southside Virginia and Tidewater Virginia fell below Statewide totals decisively in all 12 cognitive clusters. Although Southwest Virginia fell below the State total in Language Arts: Grammatical Usage, and Central Virginia in Social Studies and Work-Study Skills: References, and Charts, these differences were so minimal as to be unmeaningful in an overall view.

Rank order of regions determined by the number of cognitive clusters at or above the national means was as follows: Nothern Virginia -12; Southwest Virginia and Valley of Virginia -10; Central Virginia -7; Tidewater Virginia -1; and Southside Virginia -0.

Non-technically stated, a need is any score or achievement that ranges so far from the average score or achievement (State average or national average) that the chances of that happening by accident (chance) are only 2½ times in 100 testing after testing. If a score, however, ranges from the average so that it could happen by chance more than 2½ times in 100 testing after testing, then that score is not considered to have met the confidence (non-chance) criteria and thus could not denote a need.

Regionally, needs are ranked in terms of decreasing criticality as follows:

Central Virginia

Work Study Skills

Northern Virignia

No Needs

Southside Virginia

Language Arts: Grammatical Usage
Language Arts: Capitalization and Punctuation
Social Studies
Work-Study Skills: Charts
Arithmetic: Concepts
Arithmetic: Reasoning
Reading: Vocabulary
Reading: Comprehension
Arithmetic: Computation
Work-Study Skills: References
Science
Language Arts: Spelling

Southwest Virginia

No Needs

Tidewater Virginia

Arithmetic: Concepts
Arithmetic: Computation
Arithmetic: Reasoning
Language Arts: Capitalization and Punctuation
Language Arts: Grammatical Usage
Reading: Vocabulary
Reading: Comprehension
Social Studies
Work-Study Skills: Charts
Science
Work-Study Skills: References
Language Arts: Spelling

Valley of Virginia

No Needs

Regionally, areas of excelling are designated by order of increasingly high achievement as follows:

Central Virginia

Arithmetic: Computation
Arithmetic: Reasoning
Arithmetic: Concepts

Northern Virginia

Language Arts: Capitalization and Punctuation
Language Arts: Grammatical Usage
Arithmetic: Concepts
Arithmetic: Computation
Arithmetic: Reasoning
Science
Reading: Comprehension
Work Study Skills: Charts
Language Arts: Spelling
Social Studies
Work Study Skills: References
Reading Vocabulary

Southside Virginia

No areas of excellence

Southwest Virginia

Arithmetic: Reasoning
Arithmetic: Computation
Arithmetic: Concepts
Work-Study Skills: Charts
Reading: Vocabulary

Tidewater Virginia

No areas of excellence

Valley of Virginia

Language Arts: Capitalization and Punctuation
Language Arts: Grammatical Usage
Arithmetic: Reasoning
Work-Study Skills: Charts
Reading: Comprehension
Arithmetic: Concepts
Social Studies
Work-Study Skills: References
Arithmetic: Computation
Reading: Vocabulary
Science
Language Arts: Spelling

Cognitive Achievements and Needs: Grade 7

The grade 7 sample intelligence quotients were assessed by the California Short-Form Test of Mental Maturity.

Regionally, mean levels of Language I.Q., Non-Language I.Q., and Total I.Q. were highest in Northern Virginia. Central Virginia ranked lowest in Non-Language I.Q. and Total I.Q., while Southside Virginia ranked lowest in Language I.Q. The scores for the Language I.Q. and Total I.Q. for the Central, Southside and Tidewater regions were seriously below the Statewide mean. On the other hand, Northern Virginia and Valley of Virginia had considerably higher scores than the Statewide mean, which indicates an unbalanced situation with regard to measured I.Q.'s existent in Virginia.

Regionally cognitive needs and their criticality at Grade 7, as measured by the SRA Achievement Series, Green Level, and ranked in terms of decreasing criticality are as follows:

Central Virginia

Science
Language Arts: Capitalization and Punctuation
Language Arts: Spelling
Arithmetic: Reasoning
Arithmetic: Concepts

Reading: Vocabulary
Reading: Comprehension

Northern Virginia

No needs (excellence achieved in all 12 clusters)

Southside Virginia

Work-Study Skills: References
Work-Study Skills: Charts
Arithmetic: Computation
Arithmetic: Reasoning
Social Studies
Arithmetic: Concepts
Language Arts: Capitalization and Punctuation
Language Arts: Grammatical Usage
Reading: Vocabulary
Reading: Comprehension
Science
Language Arts: Spelling

Southwest Virginia

Social Studies
Language Arts: Capitalization and Punctuation
Language Arts: Grammatical Usage
Language Arts: Spelling
Arithmetic: Concepts
Reading: Vocabulary
Work-Study Skills: Charts

Tidewater Virginia

Work-Study Skills: References
Work-Study Skills: Charts
Arithmetic: Computation
Social Studies
Arithmetic: Reasoning
Language Arts: Capitalization and Punctuation
Arithmetic: Concepts
Language Arts: Grammatical Usage
Reading: Vocabulary
Reading: Comprehension
Science
Language Arts: Spelling

Valley of Virginia

No needs (excellence achieved in all 12 clusters)

In Grade 7, no region had a mean at or above the national norm in Social Studies, References, and Charts.

Cognitive Achievement and Needs: Grade 11

Assessment of the intelligence or aptitude of the Grade 11 sample was made by administration of the School and College Ability Test.

Regionally, the mean level of the Verbal Score was highest in Northern Virginia and fell below the national mean by only one point in the Valley of Virginia and Central Virginia. Quantitative and Total Score means in all regions were equal to or greater than the national norms, but were considerably higher in Northern Virginia.

Central Virginia was lower than the State averages in all three subtests, Valley of Virginia lower in Verbal and Total scores, and Southside lower in Verbal. Both Northern Virginia and Tidewater Virginia were higher in all three subtests.

Central Virginia fell below Statewide total mean converted scores in all six cognitive clusters as measured by the Sequential Tests of Educational Progress. Southwest Virginia fell below the Statewide means in Social Studies, Science, Mathematics and Writing. Southside was below in Social Studies, Science, Mathematics and Listening. These differences were so minimal (the greatest variation being three points) as to be insignificant in an overall view.

Rank order of regions determined by the number of cognitive clusters at or above the national means was as follows: Northern Virginia -5; Valley of Virginia, Southside and Tidewater Virginia -4 each; and Southwest and Central Virginia -3 each.

Reporting by cognitive cluster, all six regions had means at or above the national norm in Social Studies, Reading, and Writing; Valley of Virginia alone fell below the national norm in Listening; Northern Virginia alone ranked above the national mean in Science; and all six regions fell below the national mean in Mathematics.

Ranked in order of decreasing criticality are the following needs by regions:

Central Virginia

Science
Mathmetics
Reading
Writing
Social Studies
Listening

Northern Virginia

No needs

Southside Virginia

Listening

Southwest Virginia

No needs

Tidewater Virginia

No needs

Valley of Virginia

Mathematics
Listening

Needs in Reading

In Virginia Reading has been and continues to be one of the curriculum areas of major concern. Therefore, the following information on Reading is included in this paper.

Only 67.3 percent of the reading objectives were measured by the test items instead of the arbitrary, though dependable, standard of 75 percent. Nevertheless, those reading objectives measured by a sufficiently large number of items to warrant inferential comparisons were investigated to determine specific reading needs by regions as well as ranking according to successful attainment by the total State sample.

Only the needs are indicated below by specific objectives:

Grade 4

Thirteen of the reading objectives were measured by a significantly large

number of items to warrant regional comparisons with Statewide means.

Only Southside and Tidewater had needs among the eligible reading objectives for inferential comparisons; Southside had six and Tidewater one, rank ordered according to decreasing criticality as follows:

Southside Virginia

Objective 37 - Apply specific developmental skills when reading special subject matter;
Objective 7 - Grasp meanings of units of increasing size-phrase, sentence paragraph, whole section;
Objective 41 - Read at normal rate for comprehension interpretation and evaluation;
Objective 1 - Possess a large sight vocabulary at grade level;
Objective 6 - Possess a rich, extensive, and accurate vocabulary at grade level;
Objective 40 - Read rapidly to get general idea of selection or for review.

Tidewater Virginia

Objective 37 - Apply specific developmental skills when reading special subject material

Grade 7

Nineteen of the reading objectives were measured by a sufficiently large number of items to warrant regional comparisons with Statewide means.

Only Southside Virginia had needs among the 19 reading objectives. These needs are rank-ordered according to decreasing criticality as follows:

Southside Virginia

Objective 14 - Remembered what they have read;
Objective 8 - Find answers to specific questions;
Objective 9 - Note and recall details;
Objective 41 - Read at normal rate for comprehension, interpretation, and evaluation;
Objective 1 - Possess a large sight vocabulary at grade level;
Objective 6 - Possess a rich, extensive, and accurate vocabulary at grade level;
Objective 40 - Read rapidly to get general idea of selection of for review;

Objective 7 - Grasp meanings of units of increasing size: phrase, sentence paragraph, whole sections.

SUMMARY VIRGINIA EDUCATIONAL NEEDS ASSESSMENT - AFFECTIVE DOMAIN

The Virginia Educational Needs Assessment Study was conducted on the concept that the school and classroom, as a social system, provide the setting within which the self-system of the learner is expressed in three output areas: learner-oriented behavior in the cognitive domain, learner-oriented behavior in the affective domain, and the interrelationships of these cognitive and affective behaviors. These behavioral outputs were considered as indicators of Self Perceptions, Verbally Expressed Behaviors, and Manifest Behaviors which the learner originally possessed on entry to the school and classroom.

I SELF-PERCEPTION

A. Worth
   1. Physical Self
      a. as perceived by self
      b. as self perceives the attitudes of significant others
   2. Personal self
      a. as perceived by self
      b. as self perceives the attitudes of significant others

B. Competence
   1. self to task
   2. self to others

II VERBALLY EXPRESSED BEHAVIOR

Verbally expressed behavior was conceived as both written and oral communication or behavior including the cognitive and affective domains.

A. Cogntive domain
   1. Subject matter and skill areas
   2. Specialized cognitive experiences of the learner-supportive type, e.g. health education

B. Affective domain
   1. Attitudes
      a. Self to others
         (1) interpersonal relations with peers, teachers family

         (2) community and societal relations in the formation of citizenship and democratic ideals

      b. Self to Task
         (1) school,education, learning
         (2) vocation

   2. Values
      a. Self to others
         (1) ambition, truth, honesty, equality
         (2) dependability, promptness, independence

      b. Personal self

III MANIFEST BEHAVIOR

A. Influenced by
   1. An internalized self
   2. An external reward and punishment system
   3. An ego defense

B. Demonstrated by
   1. Positive attitudes and interests as well as competencies in citizenship
   2. Feelings of worth as well as competency in the school and classroom
   3. Feelings of worth as well as competency in interpersonal relationships

C. Classified by
   1. Level of involvement - low versus high
   2. Type of involvement - conforming versus non-conforming

Data for assessing needs were obtained by using the Virginia Affective Assessment Questionnaire (VAAQ). Items on the questionnaire were divided into four behavioral categories: (1) citizenship; (2) school,education and learning; (3) interpersonal relationships; and (4) self-esteem.

Differences of two or more answer choices between regional and State total mode responses can be interpreted as needs. A Modal Deviant, or regional difference

in terms of modal responses, is defined as a difference of two or more answer choices between the State total mode response and the regional mode response. For example if U was a modal answer for the State, on the scale of A (always) -U (usually) -S (sometimes) -R (rarely) -N (never), any regional response of R or N would be considered a Modal Deviant.

In Grade 4, there were no Modal Deviants.

In Grade 7, the VAAQ consisted of 66 items, of which 61 were used to correlate with teacher responses. Modal Deviants occurred in all four behavioral categories: (1) citizenship; (2) school, education and learning; (3) interpersonal relations; and (4) self-esteem.

In Grade 11, the VAAQ consisted of 69 items, 61 of which could be correlated with teacher items. Two Modal Deviants occurred: (1) citizenship and (2) interpersonal relations.

A summary of Modal Deviants occurring in the teacher mode responses by behavioral category demonstrates that in citizenship one Modal Deviant occurred in Grade 4, and none occurred in either Grades 7 or 11. The school, education, and learning, and self-esteem categories had no Modal Deviants in any grade. Interpersonal relations had no Modal Deviants in grade 4 or grade 7, but two Modal Deviants in Grade 11.

In items of the previously stated definition of need in the affective domain, there were only six different items where students responded with sufficient Modal Deviation (region mode versus State Mode) to be interpreted as needs. These items, as classified in the VAAQ, fell into all four behavioral categories assessed: (1) citizenship; (2) school, education, and learning; (3) interpersonal relations; and (4) self-esteem. Except in these isolated instances, the regions did not differ in affective status and needs.

Summarizing the affective status and needs assessment, the conclusions drawn from the self-ratings of student behavior by simple and sophisticated analyses

revealed wide regional, grade, and Statewide consensus of desired and actual behavior. Teacher ratings of student affective behavior and student self-ratings agreed very closely, except in Grade 11.

OVERALL SUMMARY

The Virginia Educational Needs Assessment conducted by the Bureau of Educational Research, University of Virginia in 1970 has had a profound effect on Public Education in Virginia. The results of this study were influential in the development and implementation of the Virginia Standards of Quality and Objectives for Public Schools in Virginia 1972-1974 which program was enacted into law and funded by the General Assembly of Virginia in 1972.

In addition, this massive study has stimulated interest in needs assessment by public school educators in the Commonwealth and has generated implementation of needs assessment at the grass roots level with local funding.

Finally, the determination of needs in the cognitive and affective domains led to the initiation of investigation of educational needs in Virginia in the third and final domain, psycho-motor. Part II of this paper addresses the second needs assessment study in the psycho-motor domain.

PART II

PSYCHO-MOTOR DOMAIN

INTRODUCTION

In 1971, toward the conclusion of the Virginia Educational Needs Assessment Study in the cognitive and affective domains, the Virginia State Department of Education recognized that a void existed in the analysis of educational needs in the psycho-motor domain. A task force was organized within the Department and discussions with Dr. Newell C. Kephart resulted in a contract between the Virginia State Department of Education and the Glen Haven Achievement Camp Association to conduct a psycho-motor needs assessment of Virginia School Children.

Since this was a new approach in public education, much preliminary work had to be accomplished to develop goals, objectives and an operational plan.

It was determined that the study would concentrate upon children in kindergarten through grade four including a component of educable mentally retarded children. The State Department of Education, Division of Educational Research and Statistics developed a sample of 169 classes in 76 schools with a potential sample of 1500 students. Within each of the 169 selected schools a random sample of participating students was chosen by taking every third child from the class roll.

Early in the discussions between the Task Force and the contractor, four questions were raised which were not easily answered: (1) What is the psycho-motor domain? (2) What measures are available to assess psycho-motor abilities? (3) What, if any, are the needs of Virginia school children within this domain? and (4) What are the implications for curriculum and teacher education?

These four questions became the formal basis for the study.

WHAT IS THE PSYCHO-MOTOR DOMAIN?

It was possible to identify many components which may be included within this domain: sensory input, acuity of the sensory mechanisms, and organization of the sensory information. The critical feature of the psycho-motor domain

is the relationship of the preceding to motor or output activity.

The psycho-motor domain must be regarded as a complex integration of many functional processes. This integration results from and in the interaction of the individual with his environment. Kephart (Slow Learner in the Classroom 2d Edition) has pointed out that it is not possible to speak of input and output activity as if they were separated. The total activity of the individual, i.e. the relationship of incoming information to the application of that information must be considered. Only in this manner is the child able to organize himself in relationship to his environment and to monitor and organize this interaction within a time-space framework.

Cognition must be regarded as a super structure allowing for conscious identification and manipulation of relationships which were first established in the psycho-motor domain. Further elaboration of these cognitive aspects will depend upon how elaborately the psycho-motor domain has evolved as well as the elaboration of previous cognitive relationships. The performance of an individual in the cognitive domain will be influenced by the status of his psycho-motor domain. However, the relationships of the psycho-motor domain to function may vary widely from individual to individual.

Inherent in the definition of the psycho-motor domain are the processes of interaction between the individual and his environment. The effect of these interacting processes may be contrasted with effects of an environment upon an individual who is not adequately interacting. Interaction is dependent upon the individual's psycho-motor development.

WHAT MEASURES ARE AVAILABLE TO ASSESS PSYCHO-MOTOR ABILITIES?

Due to the multi-dimensional nature of psycho-motor behavior it was not possible to assess performance in this area as an isolated entity. For the purpose of accomplishing an educational needs assessment in this domain it was necessary to select measurement tools that would permit an evaluation of the major component processes. With this in mind, a review of evaluation instruments in use was conducted. These included:

A. Illinois Test of Psycholinguistic Abilities, Revised Edition, Kirk, McCarthy and Kirk, 1968.

B. Marianne Frostig Developmental Test of visual Perception, Third Edition, Frostig, 1966.

C. The Primary Visual Motor Test, Haworth, 1970.

D. Lincoln-Oseretsky Motor Development Test, Sloan, 1951.

E. Purdue Perceptual-Motor Survey, Roach and Kephart, 1966.

F. Southern California Perceptual Motor Tests, Ayres, 1969.

G. Goldman-Fristoe-Woodcock Test of Auditory Discrimination, Goldman, Fristoe and Woodcock, 1970.

H. Test of Non-verbal Auditory Discrimination, Experimental Edition, Buktenica, 1968.

Following careful analysis of each of these eight instruments, two the Purdue Perceptual-Motor Survey(PPMS) and the Test of Non-Verbal Auditory Discrimination (TENVAD) were selected for utilization in the Virginia study.

Purdue Perceptual-Motor Survey

The Purdue Perceptual-Motor Survey (PPMS) was selected as the instrument that would best measure the principal psycho-motor components.

The PPMS was authored by Eugene Roach and Newell C. Kephart in 1966 with the avowed purpose of:

> "To provide the teacher with a tool which can be used to identify those children whodo not possess perceptual-motor abilities necessary for acquiring academic skills by the visual instructional methods."

The PPMS is the product of several studies that subjected Kephart's Perceptual-Motor Survey (PMS) from the Slow Learner in the Classroom (1960) to a variety of Statistical designs. The PMS was used for several years at the Achievement Center for children, Purdue University, before being modified and published as the PPMS.

The authors of the PPMS, Roach and Kephart, considered five major component factors with twenty-two separate items grouped as shown below.

(1) Balance and Posture
- Walking Board - forward
- Walking Board - backward
- Walking Board - sidewise
- Jumping

(2) Body Image and Differentiation
- Identification of body parts
- Imitation of movement
- Obstacle course
- Kraus - Weber
- Angels-in-the-snow

(3) Perceptual-Motor Match
- Chalkboard - circle
- Chalkboard - double circle
- Chalkboard - lateral line
- Rhythmatic writing - rhythm
- Rhythmatic writing - reproduction
- Rhythmatic writing - orientation

(4) Ocular Control
- Ocular pursuit - both eyes
- Ocular pursuit - right eye
- Ocular pursuit - left eye
- Ocular pursuit - convergence

(5) Form Perception
- Visual Achievement forms - form
- Visual Achievement forms - organization

In 1972, Renate Neeman subjected the normative sample from Roach's study (1962) to Factor Analysis and produced an eight factor profile of the PPMS, which was the formate used in the Virginia Study. The following list indicates which items of the PPMS were grouped according to Neeman's orthogonal rotated factors:

Factor I Walking board - forward

	Walking board - backward
	Walking board - sidewise
Factor II	Chalkboard - circle
	Chalkboard - double circle
	Chalkboard - lateral line
	Chalkboard - vertical line
Factor III	Ocular pursuit - 12 items*
Factor IV	Jumping
	Identification of body parts
	Imitation of movement
	Angels-in-the-snow
Factor V	Rhythmic writing - rhythm
	Rhythmic writing - reproduction
	Rhythmic writing - orientation
Factor VI	Form perception - form
	Form perception - organization
Factor VII	Obstacle course
Factor VIII	Kraus-Weber

Available information indicates that the items of the PPMS have high construct validity; the instrument measures unique psycho-motor factors, and that among trained examiners, there is a high degree of reliability.

Test of Non-Verbal Auditory Discrimination (TENVAD)

In 1968, Norman A. Buktenica developed in the auditory area the Test of Non-Verbal Auditory Discrimination (TENVAD), a measure of functional ability. Buktenica describes the test as follows:

> The TENVAD was constructed for the purpose of assessing auditory discrimination in young children and is patterned after the model of the Seashore Test of Musical Talent (1960). It is non-verbal and is intended to provide an auditory discrimination test that is fairly stable across socio-economic and racial lines. The TENVAD is made up with 50 pairs of tones in five subtests - Pitch Test, Loudness Test, Rhythm Test, Duration Test, and Timbre Test, each having 10 pairs of tones.

The TENVAD was designed to be used for group testing but, if the subjects being tested have difficulty following the examiner's instructions, it may be administered individually with no completion time limit.

By including the TENVAD in the psycho-motor assessment battery, all principal sensory and perceptual channels were accounted for.

Development of the Virginia Psycho-Motor Screening Instrument (Checklist)

A need was seen to provide classroom teachers with an instrument which could be easily administered to identify possible psycho-motor deficiencies. In the development of such an instrument the Glen Haven Achievement Center personnel considered behaviors manifested by children in the classroom which would appear to be indicative of psycho-motor problems. There was an attempt made to correlate behaviors to test data obtained in the PPMS and the TENVAD, although it was anticipated that the effects of numerous other factors and interaction would be involved in the classroom behavior.

A group of classroom teachers were requested to take the listing of these behaviors to assure intelligibility and accuracy in interpretation. Based upon corrective criticism of these teachers several items were reworded.

A first draft of the checklist was printed with 54 items written in

negative form, I.E. the behaviors described were inappropriate and indicative of deficits in the psycho-motor domain.

The design of the checklist was such that the teacher would place a check (√) in a plus (+) column, indicating the student did manifest the described behavior, or place a check (√) in a minus (-) column if the student did not manifest the behavior. An option of a check (√) in a zero (0) column was offered if the teacher could not recall how the student performed specifically or had not had sufficient observation to judge the behavioral pattern of the student.

To obtain field test data four teachers in a Colorado open school assessed forty first and second graders from four different classes with selection of students being made equally from upper and lower levels of the classes.

Each teacher prepared checklists on each of the forty students, this being possible due to personal contact of each of the teachers with all forty children in the open school environment.

Responses of the teachers indicated fair agreement, although total scores varied. Further improvement in wording and instructions were made by these teachers and the checklist was finalized.

Another pilot test of the checklist and the other two instruments were conducted in Virginia using 180 children in grades K-4 and special education. Six schools across the State were used.

Evaluation of the pilot study data indicated the following:

(1) Fair agreement was obtained between the composite PPMS scores and score obtained on the checklist.

(2) Six items on the checklist appeared to be yielding no useful information. It was decided to leave these items in the checklist to obtain data from the larger sample.

(3) The TENVAD would require individual testing in some cases or in groups of no more than five among the special education, kindergarten and first grade classes. The administration of the TENVAD and the management of the child in these classes would be difficult for examiners with limited training.

(4) Because of the anticipated problem in the collection of TENVAD data and the limited time examiners would have in a particular school, the examiners were asked to give priority to the group testing of second third and fourth graders. Where possible, an attempt should be made to gain the assistance of speech and hearing personnel in the testing of special education, kindergarten and first grade children.

Collection of Data

In a project of this type, collecting data and information was quite unique, therefore, the following information is provided on the collection techniques utilized.

The Research Division of the Virginia State Department of Education provided the Glen Haven Achievement Center with the list of schools (76) and respective classes (169) within these schools which were to be involved in the study. The schools and classes selected were to have appropriately represented the proporation of identifiable groups within the State: Southwest Virginia, Valley of Virginia, Northern Virginia, Southside Virginia, Central Virginia, and Tidewater Virginia; three population designations: urban, suburban, rural; and three socio-economic levels as measured by children who received free lunch, children who partially paid for their lunch, and children who paid entirely for their lunch.

It was necessary to locate and select individuals to do the testing. It was determined that graduate students in Virginia with appropriate backgrounds would be the best solution due to the training experience that would be provided and the interest that might be generated among Virginia colleges. Training sessions were provided for the sixteen graduate students selected to insure standardization of testing techniques and procedures. These training sessions were concerned with five specific objectives:

(1) To familiarize the examiners with all testing instruments being used (the PPMS and the TENVAD).

(2) To develop examiner's skills in testing and assure standards of reliability among all examiners.

(3) To acquaint workers with procedures in working with school personnel, for leaving forms which were to be completed by school personnel, for random selection of children, and for returning data.

(4) To assign schools and classes in the sample to field workers.

(5) To resolve any problems in logistics, i.e. travel, supplies, conflicting schedules of workers, etc.

Since the training sessions were conducted in two schools in Virginia, the examiners, during the training session, had the opportunity to work with students under the tutelage of the Glen Haven Achievement Center personnel.

Every effort was made to help the field personnel to identify with the project. This was achieved by sharing as much background information regarding the project as time permitted and allowing them every opportunity possible to combine their efforts and achieve the necessary results as efficiently as possible.

Following the assignment of the graduate students to schools and classes, their mission was defined to test ten children selected randomly in each assigned class within the following four week period. Upon arriving at the school, the examiners introduced themselves and obtained an alphabetical list of the students in the class to be tested. By using a random number technique, the examiner selected the children to be tested. If a school had more than one class for a particular grade, the examiner was instructed to ask the principal to select the most heterogeneous class. The examiners were asked to select substitutes for children who had known obvious physical defects, such as limited and uncorrected deficits in visual or auditory acuity, and crippled motor ability.

The Special Education classes included in the study were primary classes for educable mentally retarded. However, and not unexpectedly, the children enrolled in these classes represented a wide range of problems and ages. It also became apparent that a number of "special education" children were integrated in the regular classes in the sample. It was decided that the examiners would

let the random selection procedure remain in effect with respect to these children. Specifically, if a child,enrolled in a regular classroom,was randomly selected, he would be left in the sample even though he might be a candidate for a special education class, provided the child had no physical defects.

The Independent Variable Summary Sheet, when completed, would supply pertinent identifying data to be used in the study. It was therefore necessary to instruct the field examiners with regard to its completion. Upon the selection of the ten children from a class, the examiners entered the ten names on the Summary Sheet and school personnel were to complete the form and return it to the Glen Haven Achievement Center in a post-paid envelope.

The Virginia Psycho-Motor Screening Instruments (Checklist) were sent by mail to the principals involved with a letter from the Glen Haven Achievement Center explaining their use. Thirty-four were sent for each classroom from which came a sample of ten children who were administered the PPMS and the TENVAD by the examiners. The teacher concerned was asked to complete a Checklist for each of those ten children and also for each of the reamining children in her classroom. These checklists were then returned to the Glen Haven Achievement Center in post-paid envelopes.

Much credit is given to the Virginia classroom teachers who participated in this project. Accurate data was received on 1371 out of a possible 1690 students which represents an eighty-one percent return. This was considered as an excellent response in a research project which required"mail-in" data accumulative techniques. Additional Checklists were returned for 1803 children.

Frequency Distribution of Independent Variables

Initial analysis of data collected involved the establishment of frequency distributions of the independent variables obtained from the Independent Variable Summary Sheet, completed by each participating school.

The tabular displays of this data can be found in the Psycho-Motor Needs Assessment of Virginia School Children (November 1973). A copy of this study can be obtained from the Special Assistant for Public Information and Publications, Virginia State Department of Education, Richmond, Virginia 23216. As a result, these tables are not being reproduced in this paper.

It was found that the inclusion of data from the children in the Special Education classes tended to skew the total results and in the Appendix of the study is a recalculation of these frequency Distributions with the Special Education class children removed from the tabulations which provided for useful information.

Following is a listing of the Frequency Distribution of independent variables found in the study:

Table 1: Frequency Distribution: Virginia Schools by Geographic Region

Table 2: Frequency Distribution: Virginia Schools - Southwest Virginia

Table 3: Frequency Distribution: Virginia Schools - Valley of Virginia

Table 4: Frequency Distribution: Virginia Schools - Northern Virginia

Table 5: Frequency Distribution: Virginia Schools - Southside Virginia

Table 6: Frequency Distribution: Virginia Schools - Central Virginia

Table 7: Frequency Distribution: Virginia Schools - Tidewater Virginia

Table 8: Frequency Distribution: Grade Level

Table 9: Frequency Distribution: Age Level

Table 10:Frequency Distribution: Intelligence Quotient Level

Table 11:Frequency Distribution: Socio-Economic Status (Lunch Status)

Table 12: Frequency Distribution: Sex

Table 13: Frequency Distribution: Race

Table 14: Frequency Distribution: Rural-Suburban-Urban Status

With the data obtained and analysis of the individual distributions, it was determined that the sample obtained in the study was representative of school children across the State of Virginia.

Analysis of the Psycho-Motor Instruments and Distribution Frequencies

The Purdue Perceptual-Motor Survey

In the course of data analysis of the Virginia Study, the PPMS was subjected to the Cluster Analysis Procedure (Tryon and Bailey) using 1371 subjects from grades Kindergarten through four, plus children enrolled in Special Education classes. The following list represents the oblique unifactor structures generated as a product of this statistical procedure and the items included in those clusters. Also included are the corresponding coefficients of inter-correlation.

Clusters	Items	Coefficient
I	Ocular pursuit - left eye	.88
	Ocular pursuit - right eye	.86
	Ocular pursuit - both eyes	.86
	Ocular pursuit - convergence	.58
III	Walking board - backward	.77
	Walking board - sidewise	.71
	Walking board - forward	.58
IV	Chalkboard - double circle	.64
	Chalkboard - circle	.63
	Chalkboard - vertical line	.60
	Chalkboard - lateral line	.45
II	Rhythmic writing - orientation	.83
	Rhythmic writing - reproduction	.77
	Rhythmic writing - rhythm	.75
V	Visual achievement - form	.55
	Visual achievement - organization	.54
VI	Jumping	.66
	Angels-in-the-snow	.59
	Imitation of Movement	.54
	Identification of body parts	.52

VII	Obstacle course
VIII	Kraus-weber

It should be noted that the factors from Neeman's study using Roach's normative sample and the clusters from the Virginia study using the extensive sample of the Virginia school population are identical.

The identical replication of Neeman's factors using a different statistical procedure and a different sample of subjects, conclusively support the multi-component characteristic of the PPMS as a comprehensive measure of perceptual-motor behavior and psycho-motor performance.

Two correlation matrices are included in the appendices of the Virginia study: (1) a correlation matrix of the PPMS clusters, and (2) a correlation matrix of each item on the PPMS with each of the clusters.

For the purpose of the Virginia study and for future use of the PPMS, the areas measured by the PPMS as component parts of the construct psycho-motor are defined as follows:

Cluster I — Ocular Control

Ocular pursuit items consisting of monocular and binocular coordination of eye muscles in pursuit and convergence tasks, coordination of eyes with the visual target, and the ability to maintain these controlled relationships between eye and target.

Cluster II — Rhythmic Writing

Rhythmic writing items involving directional translation of arm movements from visual images, visual figure-ground relationships, movement fluency, and the continuity of the perceptual-motor match.

Cluster III — Balance

Walking board items involving postural flexibility, coordination of the two sides of the body in relationship to gravity, coordination of the upper and lower body, and matching body orientation to a visual-spatial structure.

Cluster IV — Visual Motor Control

Chalkboard items (excluding rhythmic writing) requiring laterality and the interaction between the two side of the body, fluency and ease of movement, visual-motor relationships in spatial planning, and crossing body

Cluster V	Form Perception
	Visual achievement items requiring visual perception, visual to motor translation, continuity and organization of reproduction, visual figure-ground relationships, and the planning and anticipation of spatial requirements.
Cluster VI	Differentiation
	The four items - jumping, angels-in-the-snow, imitation of movement, identification of body parts which involve differentiation of body parts, translation and coordination of body movements from visual or auditorily presented patterns, and synchrony of response.
Cluster VII	Obstacle Course
	Obstacle course items requiring judgement of space in relationship to the body and movement.
Cluster VIII	Kraus-Weber
	Kraus-Weber items requiring the differentiation of upper and lower halves of the body, and the ability to sustain work of identified muscle groups.

Having identified and defined the clusters into which the items of the PPMS appeared, it was then possible to determine the deficit areas within the psychomotor domain by evaluating the response performance of the 1371 subjects from whom Perceptual-Motor Surveys were available.

According to the scoring criteria of the PPMS, one of four alternative scores were assigned to a subject's performance on an individual item by the examiner. Following is an explanation:

Score 4	Assigned if the child performs the task accurately and easily
Score 3	Assigned if the child performs the task accurately but has minor difficulties.
Score 2	Assigned if the child performs the task with extreme difficulty.
Score 1	Assigned if the child is unable to perform the task.

Each subject was assigned a score 4, 3, 2, or 1 on each of the twenty-two items in the PPMS. Scoring standards of the PPMS are such that scores of 1 and 2 are regarded as failing scores for a particular item, and scores of 3 and 4 are

regarded as passing scores. A frequency distribution of PPMS composite scores appears below. The composite score corresponds to the average score, thus, the range of scores was from 1.00 to 4.00 and reflects the total score divided by the number of items administered. This distribution included all children in the sample who were administered the PPMS, including those enrolled in Special Education classes.

A composite score of 2.49 or less was regarded as a deficit performance. Since a score of 2.50 represented the very minimum of a passing score and the very maximum of a failing score, 2.49 was chosen as the cutoff score.

FREQUENCY DISTRIBUTION: PPMS COMPOSITE SCORE

Composite Score	Subject Frequency	Percent of Total	Cumulative Frequency
No Data Recorded *	74		
1.00 - 1.24	34	2.62	34
1.25 - 1.49	9	.69	43
1.50 - 1.74	20	1.54	63
1.75 - 1.99	30	2.31	93
2.00 - 2.24	68	5.24	161
2.25 - 2.49	62	4.78	223
2.50 - 2.74	133	10.25	356
2.75 - 2.99	241	18.56	597
3.00 - 3.24	257	19.81	854
3.25 - 3.49	185	14.26	1039
3.50 - 3.74	138	10.64	1177
3.75 - 3.99	10	.77	1187
4.00	110	8.48	1297
Total	1297	100.00	

Mean	Variance	Standard Deviation	Standard Error
2.97	.41	.64	.02

Note: The composite score per subject is the average score for that subject, i.e. S1 Total Score = 75, PPMS has 22 items, 75/22 = 3.80 Average Score.

* If all items were not scored, subject's Composite Score was deleted from the sample.

A similar distribution appears in the table below but excludes children enrolled in Special Education classes. This table indicates the number and percentage of children in Kindergarten through grade four who received composite scores above and below 2.49.

FREQUENCY DISTRIBUTION ON SAMPLE EXCLUDING SPECIAL EDUCATION:
PPMS COMPOSITE SCORE

Composite Score	Subject Frequency	Percent of Total
No Data Recorded	57	
1.00 - 2.49	129	11.70
2.50 - 3.99	871	78.97
4.00	103	9.34
Total	1103	100.00

Mean	Variance	Standard Deviation	Standard Error
3.07	.32	.56	.02

Using a criteria point of 2.49, a total of 11.7% of the children in Kindergarten through grade four received deficit scores on the entire PPMS.

For the purpose of this study, it was considered essential that the subjects be evaluated in terms of the component areas os psycho-motor behavior, therefore, the scores on clusters of items was needed. Since some clusters had more items than others, it was not appropriate for comparative purposes to use total item scores per cluster, but rather an average of the items within a cluster. However, even averages of items within a single cluster may hide important data. Therefore, in order to represent the data in as conservative manner as possible and to gather more information about individual differences and the PPMS cluster themselves, Convergence Analysis was also undertaken.

Any cluster that had two or more items scored was examined in order to determine if the items within the cluster were grouped together and yielding consistent data. If the item scores were spread, resulting in a questionable distribution, the scores were not averaged and the subject's score for that cluster was eliminated from the analysis. The range of cluster scores was from 1.00 to 4.00.

Tables 17-24 in the Virginia study indicate the percentage of children in the total sample, excluding children enrolled in Special Education classes, who exhibit deficits in each of the PPMS clusters, i.e. scores at or below 2.49.

This includes the following frequency distributions:

Table 17: Frequency Distribution: PPMS Cluster I - Ocular Control

Talbe 18: Frequency Distribution: PPMS Cluster II - Rhythmic Writing

Table 19: Frequency Distribution: PPMS Cluster III - Balance

Table 20: Frequency Distribution: PPMS Cluster IV - Visual-Motor Control

Table 21: Frequency Distribution: PPMS Cluster V - Form Perception

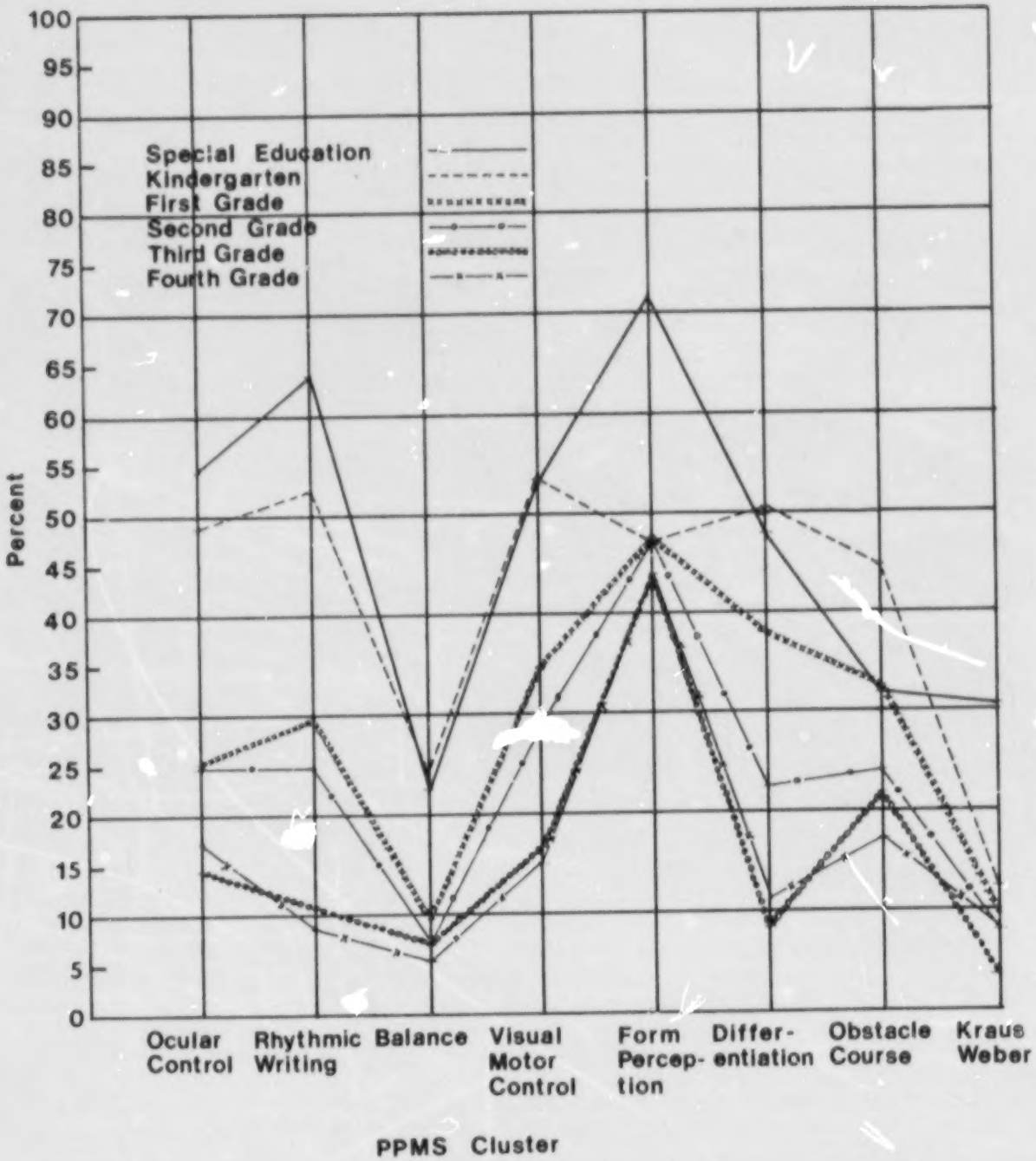
Table 22: Frequency Distribution: PPMS Cluster VI - Differentiation

Table 23: Frequency Distribution: PPMS Cluster VII - Obstacle Course

Table 24: Frequency Distribution: PPMS Cluster VIII - Kraus-Weber

The number of deficiencies in these clusters range from 7% to 8% of the population in Balance and Kraus-Weber, to 42% in Form Perception. In four of the eight clusters, failing scores were earned by 21% to 24% of the sample population. The obstacle cluster was failed by 27% of the children tested.

A graph of the Percentage of PPMS Deficiencies by Cluster and Grade follows on the next page.


Special Education
Kindergarten
First Grade
Second Grade
Third Grade
Fourth Grade
Percent
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
Ocular Control
Rhythmic Writing
Balance
Visual Motor Control
Form Perception
Differentiation
Obstacle Course
Kraus Weber
PPMS Cluster

The large number of deficiencies in the Special Education sample is followed closely by Kindergarten children. Similar relationships regarding percentage of deficits seems evident between first and second graders, and again between third and fourth graders.

As expected, the developmental nature of the psycho-motor clusters is revealed - the older the child, the less incidence of psycho-motor deficiencies. While children enrolled in Special Education classes exhibit the greatest number of deficits, significant deficiencies are noted in all grades.

Since older children were not included in this study, it cannot be stated with certainty that the percentage of deficits existing at the fourth grade level will not continue to drop. However, changes between grade three and four are very small and in three areas of attention, i.e. Ocular Control, Differentiation, and Kraus-Weber. third graders actually performed better than fourth graders. This data may indicate that increasing demands on children with marginal psycho-motor skills has adverse effects on further psycho-motor development.

The percentage of failures on Cluster V - Form Perception - remains constant from grade to grade with the exception of the larger number of deficit scores among the Special Education sample. It is not clear why these results were obtained. It is possible that the scoring criteria did not adequately discriminate among the children. However, it is also possible that the deficit scores that persist, do indeed, reflect poor visual-motor efficiency and organization skills required in the items of Cluster V.

Virginia Psycho-Motor Screening Instrument (Checklist)

Approximately 169 teachers completed a total of 3174 Checklists for each of 3174 students. Of this total, 1368 children also were evaluated with the PPMS. The remaining 1806 Checklists were obtained on children for whom no other data were available and who were enrolled in Kindergarten through grade four.

For the purpose of evaluating the Checklist data, two separate cluster analyses were performed. The first involved the 1368 Checklists for which PPMS data was available and which was labeld "original data". The second cluster analysis was obtained on the remaining 1806 Checklists and was regarded as a replication analysis. In both cases, the Cluster Analysis Procedure by Tyron and Bailey was used.

The most stringent test of reliability for a measurement instrument is the replication method employed in this project to evaluate the Checklist. By subjecting two large samples of students to independent analysis, it is possible to compare the two groups. The results indicate the discreteness of the factors measured by the Checklist.

From the original 54 questions on the Checklist, 23 items were selected as representing five different psycho-motor factors. These clusters and the items which are included in each cluster represent the oblique unifactor structures generated as a product of the cluster analysis. Also included are the coefficients of inter-correlation for the original sample and the replication sample. The item numbers refer to the numbers of the questions as they appeared in the original Checklist (see Appendix D).

VIRGINIA PSYCHO-MOTOR SCREENING INSTRUMENT

Item No.	Item	Oblique Factor Coefficient Original	Replication
CLUSTER I:	INTERNAL ORGANIZATION		
28	Is it necessary for you to tell him to do one thing at a time (eg. he cannot follow a series of instructions)?	.77	.77
44	Must verbal instructions be repeated several times?	.75	.74
41	Does he have difficulty with copying tasks (eg. writing, drawing, reproducing geometric figures from memory)?	.70	.71
23	In copying written work, must he look back and forth from his paper to the stimulus (he may seem as if he cannot recall the stimulus long enough to reproduce it)?	.69	.71
39	Does he seem overly dependent upon auditory input (eg. he may talk himself through activities; he may be able to follow verbal instructions but not written instructions)?	.66	.67
38	Does he seem to be easily distracted by visual stimuli (eg. he may look frequently at the bulletin board or to other places in the room where there are many visual displays)?	.62	.60
53	Does he have difficulty repeating sentences or numbers?	.62	.58
35	Does he tire quickly from reading or writing?	.61	.61
29	Does he daydream frequently, stare blankly, seem to be attending to nothing?	.57	.56
36	Does he persist in using his finger to keep his place when reading?	.50	.53

Item No.	Item	Oblique Factor Coefficient Original	Replication
CLUSTER II:	SUBDUED ACTIVITY		
52	Does he avoid speaking (eg. he may answer questions with single words or phrases; avoids spontaneous conversations)?	.71	.67
51	Does he talk too softly or frequently whisper a response?	.71	.61
5	Does he seem withdrawn, shy, or unusually inactive?	.68	.72
CLUSTER III:	VISION		
30	Does he often rub his eyes?	.72	.68
31	Does he seem to blink a lot?	.68	.76
32	Does he tend to cover or shade his eyes or single eye frequently?	.62	.63
CLUSTER IV:	OVERFLOW		
37	Is there excessive body shifting or movement when engaged in reading or writing tasks?	.77	.61
3	Does he often seem uncomfortable at his desk (eg. he may wrap his legs around the chair for support or frequently move excessively while working at his desk)?	.69	.71
6	Does his body move from side to side in writing tasks (either in the seat or at the blackboard)?	.68	.58
16	Does he consistently have difficulties in lining up activities (eg. is he excessively restless when standing in the lunch line)?	.55	.60

Item No.	Item	Oblique Factor Coefficient Original	Replication
CLUSTER V:	FINE MOTOR CONTROL		
7	When writing, does he often wrinkle his paper, tear it with his pencil, or is his paper usually messy and smudged?	.69	.72
17	Does he write very heavy (eg. will make dark lines and may often tear holes in his paper) or too lightly?	.66	.63
10	Does he use an excessive amount of paper when writing or drawing (eg. he may start an assignment over many times)?	.53	.56
		N = 1368	1806

Correlation of PPMS clusters and Checklist clusters were obtained using the 1368 children for whom both instruments were administered. Low correlations were obtained and indicate that separate factors are being measured. The highest correlations occurred between Checklist Cluster I, Internal Organization and PPMS Cluster II, Rhythmic Writing, 135; PPMS Cluster VI, Differentiation, .33; and the PPMS Composite Score .36.

The Checklist clusters have been determined to be of a psycho-motor nature. This determination was made on the basis of construct validity as interpreted by the Kephart Center.

For the purpose of this study, and until additional validation data can be collected, the five Checklist Clusters are defined as follows:

Cluster I — Internal Organization

Items included in this cluster appear sensitive to reception of both auditory and/or visual information and the integration of this information with response patterns. The items are particularly sensitive to the maintenance of this integration over time or continuity of integration, i.e. continuity of a single act or several acts sequentially.

Cluster II — Subdued Activity

These items detect reduced motor output or activity but are not necessarily indicative of inadequate input of processing of information. The possible causes of reduced output are several, the child may be two hyperkinetic (tense) to move easily or just the opposite, his muscle tonus may be so minimal that the child has difficulty responding to the impulse to move. There may also exist an interference which prevents the initiation of a response or the translation to a response.

Cluster III — Vision

These items relate to fatigue of the ocular-motor mechanism or specific muscle stress.

Cluster IV — Overflow

These items indicate excessive motor output as characterized by overt movement. Frequently exhibited in the child is excessive tonus in muscles not needed for the task and difficulty relaxing. Such difficulty indicates poor kinesthetic figure-ground.

Cluster V — Fine Motor Control

These items are sensitive to difficulty in fine motor control and/or the correlation of visual information with fine motor responses. Excessive tension or lack of muscle tonus may be exhibited or difficulty maintaining kinesthetic figure-ground in fine motor tasks.

Tables 26 through 30 in the Virginia Study indicate the percentage of children who exhibit deficit scores by cluster. The data is derived from the sample of 1368 subjects who also received PPMS scores and excludes the children enrolled in Special Education classes.

A deficit score was regarded as 2.49 or less. For any particular item on the Checklist, a plus (+) score had a numerical value of one and a minus(-) score had a numerical value of three. The numerical values were ordered in this fashion since the items of the Checklists were so stated that a plus response indicated poor psycho-motor behavior.

As in the analysis of the PPMS clusters, the cluster score represents an average of normally distributed scores within the cluster. Using the Convergence Analysis Procedure (see Chapter 4), any typical or questionable distributions were not included and were labeled "No Data Recorded" on the frequency distribution tables.

Test of Non-Verbal Auditory Discrimination: Experimental Edition(TENVAD)

The table below shows the frequency distribution of TENVAD total scores among children who were primarily enrolled in grades two, three and four.

Table 31

FREQUENCY DISTRIBUTION: TENVAND TOTAL SCORE

Total Score	Subject Frequency	Percent Of Total	
No Data Recorded*	717		
01 - 10	2	.31	Low Score 10.00
11 - 20	9	1.38	
21 - 30	135	20.64	High Score 48.00
31 - 40	417	63.76	
41 - 50	91	13.91	Range 38.00
Total	654	100.00	

Mean	Variance	Standard Deviation	Standard Error
34.69	33.23	5.76	.23

*This number predominately includes subjects for whom individual testing was necessary and thus fewer scores were availabe.

The limited number of TENVAD scores availalbe was due primarily to the difficulty of group testing with children enrolled in Kindergarten, grade one and Special Education classes.

Low correlation exists between the TENVAD items and the PPMS and Checklist clusters. These low correlations indicate that separate factors are being measured.

ANALYSIS OF VARIANCE

The one-way Analysis of Variance of Independent Variables was utilized to compare the effects of age, intelligence quotient, TEVAD total score, and PPMS composite score with the independent variables; grade level, socio-economic status, sex, race, rural-suburban status, and geographic region.

One Way Analyses of Variance were obtained for each of the PPMS Clusters and the Virginia Checklist Clusters with the independent variables; grade level, socio-economic status, sex, race and rural-suburban-urban status. Again these analyses were based upon the total sample excluding the children enrolled in Special Education classes.

All clusters examined in the Analysis of Variance were subjected to the Convergence Analysis procedure.

The only tables included in the study were those in which significant relationships at the .01 Level of Confidence were obtained.

Nearly all of the clusters revealed improving skill with grade. The one exception was the cluster - Form Perception. The only significant difference occured between kindergarten and third grade. This apparent failure of Form Perception to improve with grade could be attributed to too stringent scoring criteria.

Leveling off or plateauing was observed in most of the clusters. Common to Ocular Control, Rhythmic Writing, Balance, and Visual Motor Control was a lack of significant difference between grades one and two and between three and four. With Balance, the leveling off began earlier at grade two; a pattern was also exhibited in Obstacle Course and Differentiation which leveled off only at grade three.

The Kraus-Weber exhibited gradual increases from grade to grade,

but a significant increase from grade two to three and surprisingly, a moderate decrease from grade three to four.

PPMS Clusters vs. Socio-Economic Status

Tables in the study indicated that children who qualified for free lunch have significantly poorer scores on Ocular Control, Rhythmic Writing, Differentiation, and Obstacle Course than those who entirely paid for their lunch.

PPMS Clusters vs. Sex

It was indicated that females have significantly higher scores than males on the clusters Ocular Control, Rhythmic Writing, and Differentiation.

PPMS Clusters vs. Race

This analysis revealed that "Whites" have significantly higher scores than "Blacks" only on the clusters Differentiation and Kraus-Weber.

PPMS Clusters vs. Rural-Suburban-Urban Status

Three points of interest were obtained from these analyses: First that rural children score significantly higher on Visual Motor Control; Second that urban children score significantly lower on Form Perception; and finally that on the Kraus-Weber suburban children score highest.

Checklist Clusters vs. Grade Level

The analysis of variance of the Checklist Clusters were based on the long form of the Virginia Psychomotor Screening Instrument.

The mean scores of the various Checklist Clusters generally did not vary from grade to grade. However, significant differences between third graders and the poorer scores of Kindergarten children on the cluster items labeled Internal Organization were noted.

The other exception to no difference from grade to grade occurred with the Checklist Cluster Vision. Fourth graders received significantly poorer scores than either second or third graders.

Checklist Clusters vs. Socio Economic Status

Socio-Economic Status accounted for significant differences in two clusters - Internal Organization and Subdued Activity. In both clusters children who were receiving free lunches scored lower than the children who entirely paid for their school lunches.

Checklist Clusters vs. Sex

Boys exhibited significantly lower scores than girls on the Checklist Clusters - Internal Organization, Overflow and Fine Motor Control.

Checklist Clusters vs. Race

"White" children performed better than "Black" children in regard to Internal Organization and Vision.

Checklist Clusters vs. Rural-Suburban-Urban Status

Urban children received scores significantly lower than rural and suburban children on the clusters - Internal Organization, Overflow, and Fine Motor Control.

Three Way Analysis of Variance

Whenever cell size permitted, three way analyses of variance were made involving the independent variables; grade level, socio-economic status, sex, race, and rural-suburban-urban status with the PPMS composite score, PPMS Clusters and Checklist Clusters.

When computing the three way analysis of variance involving socio-economic status, the category "Partially Paid" was combined with the category "Receives Free Lunch" because of the small number of subjects in the "Partially Paid" group.

Children enrolled in Special Education classes were not included in the analysis.

PPMS Composite Score

The main effects on the PPMS composite score appeared due to grade (age) sex, and socio-economic status. Significant interactions were observed in socio-economic status vs. sex, and sex vs. race.

Socio-economic status by sex was found to have a special relationship with respect to PPMS composite score. Of the children who received free lunches, girls received lower scores than boys. Among the children who paid the entire amount, the girls received higher scores than the boys.

Sex and race were also related. Black females tended to have higher scores than males and white females.

PPMS Cluster I - Ocular Control

Analysis of the cluster, Ocular Control, did not reveal any interactions. The main effects were grade, socio-economic status, and sex.

PPMS Cluster II - Rhythmic Writing

The F Tables verified that the main effects on Rhythmic Writing were grade, socio-economic status, and sex and that significant interactions existed grade by rural-suburban-urban status, grade by socio-economic status, sex by race, and grade by sex by race.

Interactions involving grade and rural-suburban-urban status were noted. Urban Kindergarten children had the lowest scores while urban children in fourth grade had the highest scores.

Significant interactions involving grade and socio-economic status were also observed. Kindergarten children who paid for their lunch did more poorly than Kindergarten children who received free lunch; however, children in grades three and four who paid for their lunch had the highest scores.

Further interactions were seen between sex and race. Black males did poorer

than all others, but black females did better than all others.

PPMS Cluster III - Balance

It was revealed that the main effect on Balance is rural-suburban-urban status and that significant interactions of race and rural-suburban-urban status could be seen. Black suburban children and white urban children performed poorest. However, the best performances were among black children from rural and urban areas.

PPMS Cluster IV - Visual Motor Control

The F Tables indicated the significance of grade and rural-suburban-urban status and the interaction of grade by rural-suburban-urban status, grade by race, and sex by race.

Both grade and rural-suburban-urban status have an effect on Visual Motor Control. Suburban Kindergarten children and grade one urban children performed poorest. Both rural and urban scores decreased from grade three to grade four.

Grade and race also interacted. Black Kindergarten children performed poorest, but black children in grades three and four have the best scores.

Sex and race differences were also noted. While black males did poorer than white males, black females did better than white females.

PPMS Cluster V - Form Perception

No significent three-way relationships were found.

PPMS Cluster VI - Differentiation

Significant is the interaction of grade and race. The lowest scores are from black kindergarten children; the highest from grade four white children.

PPMS Cluster VII - Obstacle Course

F Tables indicated the main effects related to grade and socio-economic status. Significant interactions were obtained concerning grade by socio-

economic status, grade by race, and socio-economic status by rural-suburban-urban status.

Grade and socio-economic status differences were also seen. Kindergarten children who received free lunch or partially paid, received the lowest scores. Third grade children who entirely paid for their lunch received the highest scores.

PPMS Cluster VIII - Kraus-Weber

F Tables indicate that grade and race had significant effects on the Kraus-Weber. The F Tables also reported that grade by race, and grade by socio-economic status by race are significantly interacting.

Comparing grade and race, it is noted that black Kindergarten children received the poorest scores and black and white children in third grade received the highest scores.

The comparison of grade, race and socio-economic status was analyzed. The group that had the poorest average score is black, second grade children who entirely paid for their lunch. The highest scores come from black, third grade children who qualified for free or partially paid lunch.

Checklist Cluster I - Internal Organization

F Tables 117 indicated that, the main effects on Internal Organization were sex, race and rural-suburban-urban status. A significant interaction with race and rural-suburban-urban status was also indicated. Data revealed that black children in suburban and urban areas received the lowest scores while white children in suburban areas and white and black children in rural areas received the highest scores.

Checklist Cluster II - Subdued Activity

This cluster appears independent with no significant three way interactions.

Checklist Cluster III - Vision

F Tables indicated a source of significant effects on Vision, ie. grade, race, and grade by race.

In reference to grade and race, white children received fairly even scores through the grades with a slight drop in grade one and grade four. Black children received scores essentially the same as white children in grades one, two and three but markedly poorer scores in Kindergarten and grade four.

Checklist Cluster IV - Overflow

F Tables indicated the significance of sex and the interaction of grade and race, and points out the significant interaction of grade by socio-economic status and grade by race.

Black children scored low in Kindergarten and grade two, but high in grades one, three and four. White children exhibit a gradual increase in scores with a slight decrease at grade four.

Data was obtained concerning the interaction of grade and socio-economic status on Overflow. Low scores occur among children who paid for their lunch in grades one and three and among fourth graders partially paying or receiving free lunch.

Checklist Cluster V - Fine Motor Control

F Tables 126 indicated a significant effect of rural-suburban-urban status on the cluster, Fine Motor Control and the interaction of socio-economic status and rural-suburban-urban status.

The Study displayed the data regarding the interaction of socio-economic status and rural-suburban-urban status. The highest scores came from children in rural areas regardless of socio-economic status. The lowest scores came

from children who partially pay or receive free lunch and who reside in urban areas.

A significane of the grade and socio-economic status interaction was indicated. The lowest mean scores came from grade three children who partially pay or receive free lunch; however, the highest mean scores came from children in the same socio-economic category but in grades one and two.

CONCLUSION:

This study yielded considerable information about the nature of the psycho-motor domain, data regarding instruments of measurement, and incidence figures for the school population of Virginia. The study also verified the reliability and construct validity of the principal psycho-motor measurement instrument, the Purdue Perceptual-Motor Survey. This Survey is able to assess performance in eight separate areas of psycho-motor functioning.

Also, the study yielded a second instrument for measurement and investigation of the psycho-motor domain, the Virginia Psycho-Motor Screening Instrument (not yet fully validated). This Checklist has also proven to be a highly reliable instrument which permits the teacher with little more than a few introductory paragraphs to respond to twenty-three questions which complete an inventory of behavioral characteristics. These behavioral characteristics are associated with five different psycho-motor functions. The original intent of the Checklist was to provide a teacher checklist which would screen for suspected psycho-motor deficiencies. While the Checklist does well in identifying areas of psycho-motor deficits, it has revealed what appears to be five psycho-motor characteristics independent from the eight factors which appear on the PPMS. It is, in fact, believed that the behaviors identified on the Virginia Psycho-Motor Screening Instrument represent more complex interactions of many of the psycho-motor clusters revealed in the Purdue Perceptual-Motor Survey and with additional facts including some of the items of the Test of Non-Verbal Auditory Discrimination. These interactions are not only with each other but with variables lying outside the psycho-motor domain proper. An additional and important by-product of the Checklist is the opportunity it gives teachers to become more aware of task related psycho-motor behavior.

The Test of Non-Verbal Auditory Discrimination was not evaluated as

thoroughly as the other instruments primarily because of insufficient data across the entire sample. The desirability remains of including auditory components of the psycho-motor processes in any assessment study. The value of the TENVAD and its subtests has not been fully explored.

The study revealed a wide range of deficiencies in psycho-motor functioning in all grade levels examined. As expected, incidence of these deficiencies was greatest among the Special Education group, regardless of age, and primary school children. As age and grade level increased, incidence of psycho-motor deficiencies decreased. However, the continued decrease in the percentages of psycho-motor deficiencies was generally not observed in grade four, and in fact, some upward trends were noted. Such a pattern may very well indicate that for a large number of children, continued improvement of psycho-motor skills will not occur without intervention. In Kindergarten, the percentage of children failing one or more psycho-motor skill areas was 53%, in the fourth grade this number was 44%. The significance of the problem is evident when 17% of the fourth grade children had deficit scores on Ocular Control and 15% were deficient in Visual Motor Control - two areas alone which can easily affect efficiency in reading and writing.

The large percentages of deficits which persisted, suggest that continued attention be given to psycho-motor abilities through grade four. Any notion that attention to the development of psycho-motor skills be limited to pre-school or kindergarten children would be a serious error.

The need to incorporate psycho-motor skills into the curriculum is apparent when large numbers of children receive failing scores among several psycho-motor clusters. A curriculum which provided for the development of known processes of psycho-motor function would best meet the needs of the majority of children and would also be in agreement with the concept of the developmental nature of psycho-motor skills and that the acquisition of these skills may be facilitated

When considering a psycho-motor curriculum, it is essential that the functions and processes about which we are concerned be integrated into other areas of the curriculum and in behavior. The moderate correlations that were achieved between the Purdue Perceptual-Motor Survey and the Experimental Edition of the Checklist, reflect the complexity of the psycho-motor domain and the need to integrate these skills with all aspects of the environment. The presence of various psycho-motor abilities alone is no assurance that the child has learned to integrate and use the skills in functional situations.

The "Standards of Quality and Objectives for Public Schools in Virginia" as enacted by the General Assembly of Virginia, 1972, has stated that all school divisions will provide for kindergarten instruction. Concurrently, a review of Kindergarten curriculum is underway. It is recommended that the psycho-motor factors identified in this study be incorporated into that curriculum.

Several schools in the state are involved in the development of physical education programs which include an emphasis upon psycho-motor processes. As with the Kindergarten and in view of the findings of this study, a review of the physical education curriculum is in order.

A number of significant relationships were found when analyzing the data with one and three way analysis of variance. While several interesting relationships were observed, some of the conclusions may be questioned because of the small number of subjects involved.

Regardless of the many significant relationships identified, the primary consulsions of this report remain intact, that is, large numbers of psycho-motor deficiencies exist among the school population sampled, and that grade (age), sex, and socio-economic status produced the main effects on PPMS composite score. For example, older children performed better than the younger, girls performed better than boys, and children from higher socio-economic families performed better than those from lower socio-economic strata.

Since the various clusters of the PPMS and Checklist were measuring different psycho-motor components, expected differences in the significant relationships of each cluster to factors such as age, sex, race, soico-economic status, population density , did occur. These differences make it difficult and even unwise to draw general conclusions based upon total or composite scores. Similarly, it appears unwise to establish cut-off scores based upon total psycho-motor scores for the purpose of determining psycho-motor adequacy. This is particularly true when the concern is a remedial one, i.e. a child who failed to acquire adequate skill in one or more psycho-motor areas, beyond the time in which it might be expected to appear. Since most assessment measures and particularly screening instruments are designed to function with cut-off scores or other quantitative considerations based on total test performance,many children exhibiting need would be passed over. This is a particularly serious consideration since one or more areas of deficiency may be of no problem to one child because of any number of reasons, yet may result in major disruptions and complications in another child.

In order to more adequately assess individual need, profile analysis is desirable. Therefore, in the course of this study, provisions have been made that make it possible to retrieve data by individual subject and/or all individuals exhibiting a specific profile. Data recorded included all individual identifying information, (independent variables including the name of the child's school) and an evaluation of performance on the PPMS and Checklist clusters. Cluster performance was noted one of three ways: a plus (+) if a cluster score was 2.50 or better; a minus (-) if the cluster score indicated a deficit performance of 2.49 or less; and an (R) if the items included in a particular cluster yielded an unusual distribution. Futhermore, in the case of an"R" notation, all items in that cluster and the individual score of each item can be retrieved and re-examined.

RECOMMENDATIONS:

On the basis of this study there appear three major areas of concern which require further attention.

The first of these concerns is teacher education and the need to provide awareness of the psycho-motor skill area. Since the teacher remains the key figure in the effective implementation of any curriculum objectives, it is essential that she understand and be sensitive to the psycho-motor components of classroom performance and behavior.

The second of these concerns is an expansion of existing curriculum which will focus upon recognizable psycho-motor areas and encourage the integration of these skills into the entire curriculum.

The third area of concern is further development of assessment and screening measures and subsequent investigation regarding the nature of psycho-motor skills and their effects on behavior and academic performance.

These recommendations (1) teacher education geared toward awareness and development of psycho-motor functioning, (2) expansion of curriculum to include psycho-motor objectives, and (3) further development of test instruments and investigation of the psycho-motor domain, have been ranked in order of their immediate, practical implications. It should be noted that it may be possible to proceed with all three objectives simultaneously, which might prove to be ultimately more economical.

Teacher Education and Curriculum Expansion

Because of the developmental nature of psycho-motor skills and because of the obvious need, it is recommended that the target group be Kindergarten, grade one and grade two teachers and other teachers working with these groups. Several schools should be involved representing various socio-economic strata and race representation. Very early in the fall, the teachers should be exposed to a series of seminars and practicums relating to psycho-motor development,

significance, and assessment. The primary objective of the sessions should be to develop the teachers' observational skills and sensitivity toward psycho-motor processes, and how to effectively intervene when deficiencies are noted. Initial sessions could be presented to large groups, but it is essential that further sessions be comprised of only two or three teachers and be scheduled no less than twice monthly through December. These sessions are to be working sessions with children, both in and out of the classroom. As the sessions progress, key individuals should be identified for the future training of other teachers.

The effectiveness of the in-service program can be measured by assessing teacher attitudes and psycho-motor changes which have occurred by spring. A state wide control sample is recommended.

Simultaneous to the in-service program is the curriculum expansion phase. Beginning with existing curriculum it will be necessary to develop guidelines and activities that carry into the content areas of the various grades. The teachers may also begin to serve as resource people for further expansion of curriculum.

Further Development of Assessment Measures

Further development of assessment measures and investigation of the psycho-motor domain can best proceed by critical analysis of data already received. Such analysis would involve the clinical study of individual profiles. Additional data from cumulative record files may provide important information regarding achievement profiles, teacher evaluations and grades. It is recommended that measures of affect also be obtained for analysizing purposes, but this would require a new sample.

By clinically studying the psycho-motor patterns along with academic achievement, behavior and affective responses, a more adequate picture of the psycho-

motor domain can be obtained. Similarly, it should then be possible to determine relative significance of the psycho-motor factors.

PART III

PHASE II

COGNITIVE, AFFECTIVE AND PSYCHO-MOTOR DOMAINS

INTRODUCTION:

Following an analysis of the complete educational needs assessment by the two contactors, The Bureau of Education Research, University of Virginia (cognitive and affective domains in 1970) and the N.C. Kephart Glen Haven Achievement Center (psycho-motor domain in 1973), the Virginia State Department of Education determined that these earlier exploratory studies required later refinement and updating. As a result, the State Department of Education Needs Assessment Task Force was reinstituted and conversations were initiated with the two contractors to investigate the feasability of initiating a phase II of educational needs assessment for the State of Virginia. Such actions were taken in the fall of 1973. Following numerous conferences, staff discussions and negotiations, both contactors will be initiating in May 1974 continuation studies in the domains of their prime concern. Although the contractors will be following parallel routes during the twenty month contracting period, there will be areas and times of cooperation and coordination to insure that final results will be compatible across the three domains.

Bureau of Educational Research, University of Virginia (cognitive and affective domains)

Following is a summary of the contractual arrangements being finalized between the Virginia State Department of Education and the Bureau of Educational Research, University of Virginia:

1. Complete the Multivariate Computerized Anaysis of the 1969-1970 needs assessment to identify factors likely to be fruitful in improving educational achievement, and to identify factors needing revision in the Virginia Affective Assessment Questionnaire.

2. Develop current cognitive and affective objectives using those from the 1970 Needs Assessment as a basis.

3. Develop writing, spelling, and comprehension tests with a behavioral base for use in the Phase II study.

4. Revise and modify the Virginia Affective Assessment Questionnaire and

and pilot test the revised instrument prior to utilization with the general population.

5. Develop criterion reference tests to measure cognitive objectives in the skill areas. Pilot testing is to be accomplished prior to general utilization.

6. Provide in-service for participating professional personnel.

7. Conduct writing, spelling and comprehension tests (behavioral) in primary, elementary, junior high and secondary grades in the content areas of social studies, language and science.

8. Conduct testing with the Virginia Affective Assessment Questionnaire in grades 4,7,8, and 11 to provide base-line data for 1974 and longitudinal data on the original (1970) needs assessment sample.

9. Utilize the statewide standardized testing program in grades 4,7 and 11 and supplement for grade 8, to obtain baseline data for 1974 and longitudinal data in the cognitive domain for the original (1970) needs assessment sample.

10. Complete multivariate computerized analysis of Fall 1973 standardized testing, including longitudinal analysis over the four year period (1969-1973).

11. Conduct testing of a new sample in the fall of 1974 and spring of 1975 in both the cognitive and affective domains to obtain short-term longitudinal data.

12. Following analysis of test results, develop findings and determine priority of needs and recommend curriculum changes and instructional programs to remediate the identified needs.

N.C. Kephart Glen Haven Achievement Center

In developing this contract, two major considerations were kept in mind. The first of these considerations is to obtain that kind of information which will result in the development of an efficient and economical method of identifying and/or predicting psycho-motor deficiencies and simultaneously result in a greater understanding of the psycho-motor domain. Secondly, is the intent to take maximum advantage of the large amount of unique information obtained in the original Psycho-Motor Assessment Study.

The objectives follow:

1. To identify and to differentiate psycho-motor patterns which are developmental in nature and those which are atypical. Such

information can provide a valuable service by indicating which children will profit from more specific intervention.

2. To identify those psycho-motor factors or patterns which are related to one or more aspects of academic and cognitive achievement, social behavior, and adjustment. This information will promote greater understanding of psycho-motor abilities and enable the further assignment of priorities to various psycho-motor deficiencies.

3. To develop additional gross motor measures which identify additional psycho-motor factors such as coordination, rhythm, large muscle development, etc.

4. To develop information regarding the impact specifics of psycho-motor deficiencies upon academic performance, social behavior, and attitudes toward self.

5. Expand the psycho-motor study to include children who are pre-kindergarten age through grade 7. The addition of the grades not included in the original study (1972) will provide important information regarding developmental and remedial needs. This addition will also provide continuous data regarding expected changes over a wider grade range.

Anticipated Refinement Results

The Virginia State Department of Education feels that the original two studies provided valuable information on educational needs of Virginia school children. However, it is also realized that due to the embryonic state of the art, that these initial studies were only the first steps in the total needs assessment evaluation.

Steps taken in Phase II to obtain data for long-range longitudianl studies (4 years in cognitive and affective domains) and (2 years in psycho-motor domain) as well as provision through fall and spring testing for short-range longitudinal studies will permit much more meaningful and pertinent data for determination of educational needs in Virginia public schools.

The extension of both studies, both upward and downward grade and age-wise, will provide a much wider base for decision-making.

The development of additional testing devices by both contractors will fill in many of the voids or deficiencies found in the testing programs in the earlier studies.

Finally, upon completion of Phase II, both the Virginia Affective Assessment Questionnaire and the Virginia Psycho-Motor Screening Instrument should be fully validated for general usage.

Quality education must be based on satisfying the needs of the clientele (the students). Until the needs have been fully identified, public education will fall short of its goal. Through Phase II of the needs assessment study in all three domains, Virginia hopes to become fully accountable for providing quality education for every child in the public schools of the commonwealth according to his individual needs.

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